University of Applied Sciences

HOCHSCHULE
EMDEN·LEER

Machine Learning

Doxygen

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Agenda

Definition

Origin

- Roland Wunderling and Malte Zäckler at Zuse Institute Berlin
- Dimitri van Heesch
- 26 October 1997
- C++
- version 1.9.1 : January 8th, 2021
- contraction of two abbreviations "dox" and "gen"

Sources

- Cross-platform
  - Linux x86-64 since kernel 3.2.0 and gcc in version 4.6.3
  - Windows x86-64 since Windows XP
  - Mac OS X x86-64 since verson 10.5
  - Oracle Solaris
- General Public License
  - run the program for any purpose
  - study how a program works
  - redistribute copies
  - share to the community some modified versions

Feature

- Documentation generator
  - programming tool
  - generates software documentation
  - from comments of source code

Advantages

- Supports multiple programming languages C++, C, C#, Objective-C, Java, Python, IDL, VHDL, Fortran, PHP...
- Generates output
  - HTML, CHM, RTF, PDF, LaTeX, XML, man page
  - takes account the syntax and the structure of the language

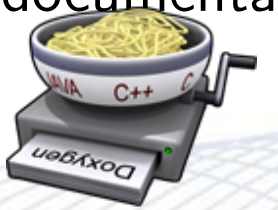
Advantages

- Is compatible with Git management software for decentralized versions
- Is easy to keep up to date
  - writes within code
  - systematizes the behavior of developers for they document their code

Graphical User Interface and tool

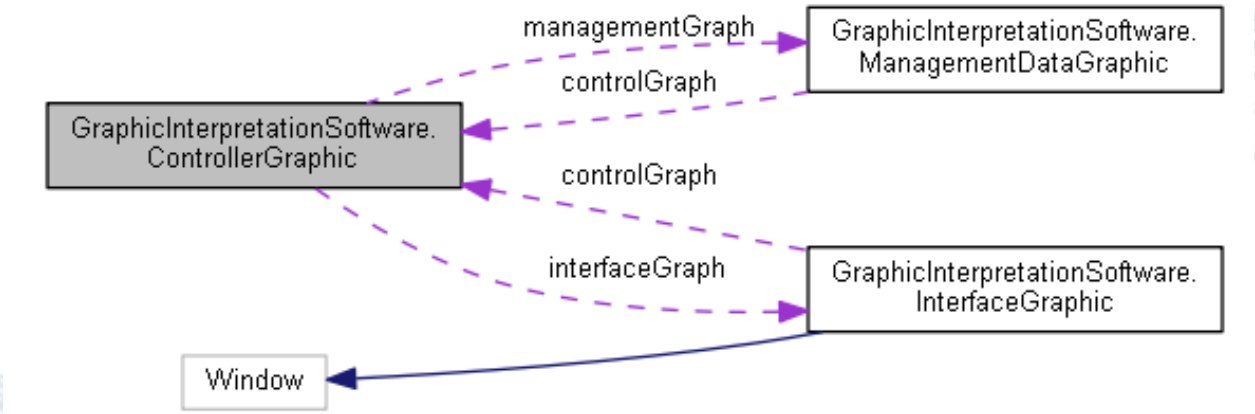
DoxyWizard

- configures and saves options of generation of Doxygen
- allows to run easily the extraction the documentation
- is available on different platforms



Graphviz

- Graph Visualization Software
- set of open-source tools
- creates graphs defined through the scripts DOT language
  -



Installations

Doxygen

- Doxygen
  - www.doxygen.nl in the section „Downloads“
    - executable file for Windows
    - tar.gz file for Linux or `sudo apt-get install doxygen doxygen-gui`
    - dmg file for Mac
    - link to www.opencsw.org for Oracle Solaris
  - installation files includes DoxyWizard

Graphviz

- Graphviz
  - www.graphviz.org in the section "Download"
    - msi file for Windows
    - rpm or deb file for Linux or
      `sudo apt-get install graphviz`
    - pkg file for Mac
    - link to http://www.opencsw.org/packages for Oracle Solaris
  - dot file is in
    `Graphviz{NumberOfVersion}\bin`

Uses

Generalities

- differentiate the comments for Doxygen
- keep the same convention throughout your program
- multiline comments understood by Doxygen for C like:

```
/**
* comments
*/

/*!
* some comments
*/

//!
//! some other comments
//!

///
/// yet other comments
///
```

Generalities

- differentiate the comments for Doxygen
- keep the same convention throughout your program
- multiline comments understood by Doxygen for Python:

```
## @package pyexample
# Documentation for this module.
#
# More details.

## Documentation for a function.
#
# More details.

"""! Documentation for a class.

More details.
 """
```

Generalities

- all of these forms of multi-line comments can be used in a single line

```
int a = 5; /** comment in one ligne */
```

- conventional forms of comments won't be taken account by Doxygen:

```
/* like this comment */
// or this comment
```

Attributes list

- to clarify and make sense of comments, each essential information has a tag to specify the nature
- list of common tags of Doxygen:
  `\a`: highlight a parameter;
  `\brief`: summary description;
  `\date`: date of creation;
  `\file <name>`: describe a file;
  `\class <name>`: describe a class;
  `\fn`: introduce the description of a function;
  `\param <name> description`: describe the function parameters;
  `\return description`: describe the parameter returned by a function.

Comment file

- comment of header of managementDataGraphic.cs file:

```
/**
 * \file ManagementDataGraphic.cs
 * \author Drezen - Leray
 * \version 3.0
 * \date 01/06/2013
 * \brief model of the chart
software
 */
```

- the order of the tags has no importance

Namespaces

package GraphicInterpretationSoftware

Detailed Description

model of the chart software

Author
Drezen - Leray

Version
3.0

Date
01/06/2013

Definition in file ManagementDataGraphic.cs.

Comment function

- comment of the function GetAllLinesAndNbLines:

```
/**
*\fn public GetAllLinesAndNbLines(out int nbLine)
*\brief This function open in read only the
*CSV file, reads until the end this file...
*It return all data in a table of string
*and indicates the number of data's line.
*\param nbLine number of data's line of the
*CSV file corresponding at each measurement.
*\return String[]
*/
```

- the order of the tags has no importance
- don't forget to describe your paramaters with `\param`

Comment function

public GraphicInterpretationSoftware.ManagementDataGraphic.GetAllLinesAndNbLines (out int nbLine)

This function open in read only the CSV file, reads until the end this file. It parses the data collected by dividing by ';'. It return all data in a table of string and indicates the number of data's line.

Parameters

nbLine number of data's line of the CSV file corresponding at each measurement.

Returns

String[]

Definition at line **622** of file **ManagementDataGraphic.cs**.

Comment enumeration

- includes '<' allowing to insert a comment for a member of enumeration:

```
/**
 * \brief Color possible for a point.
 * \details The enumeration of colors is
 * available through accessors. * /
typedef enum
{
 COLOR_BLUE, /* ! <Blue color(0,0,255) */
 COLOR_RED, /* ! <Red color(255,0,0) */
 COLOR_GREEN /* ! <Green color(0,255,0) */
}
Color;
*/
```

- the order of the tags has no importance

Create your own mainpage

```
/*! \mainpage My Personal Index Page
*
* \section intro_sec Introduction
*
* This is the introduction.
*
* \section install_sec Installation
*
* \subsection step1 Step 1: Opening the box
*
* etc...
*/
```

Using HTML commands

If you like you can also use HTML commands inside the documentation blocks.
Here is the above example with HTML commands:

```
/*!
A list of events:
<ul>
 <li> mouse events
   <ol>
     <li>mouse move event</li>
      <li>mouse click event<br>
       More info about the click event.</li>
     <li>mouse double click event</li>
   </ol></li>
 <li> keyboard events
   <ol>
     <li>key down event</li>
     <li>key up event</li>
   </ol></li>
</ul>
More text here.

*/
```

Behavior

- creates documentation even if the code is not completely commented
- indicates warning during compilation :
  `warning: The following parameters of <name class> are not documented: parameter 'dv'`
- shows that parameter exist but wihtout comment :

public GraphicInterpretationSoftware.MyMesure.MyMesure (double pt,
double dv
)

A Constructor with two parameters. It builds an instance of **MyMesure** and intiziales its two attributs : one theoretical position and one deviation.

Parameters

pt double theorical position

Returns

nothing

Definition at line **665** of file **InterfaceGraphic.xaml.cs**.

Generate Doxygen documentation

Possibilities

- DOS command On Windows create your configuration file
  `doxygen -g <config_file>`

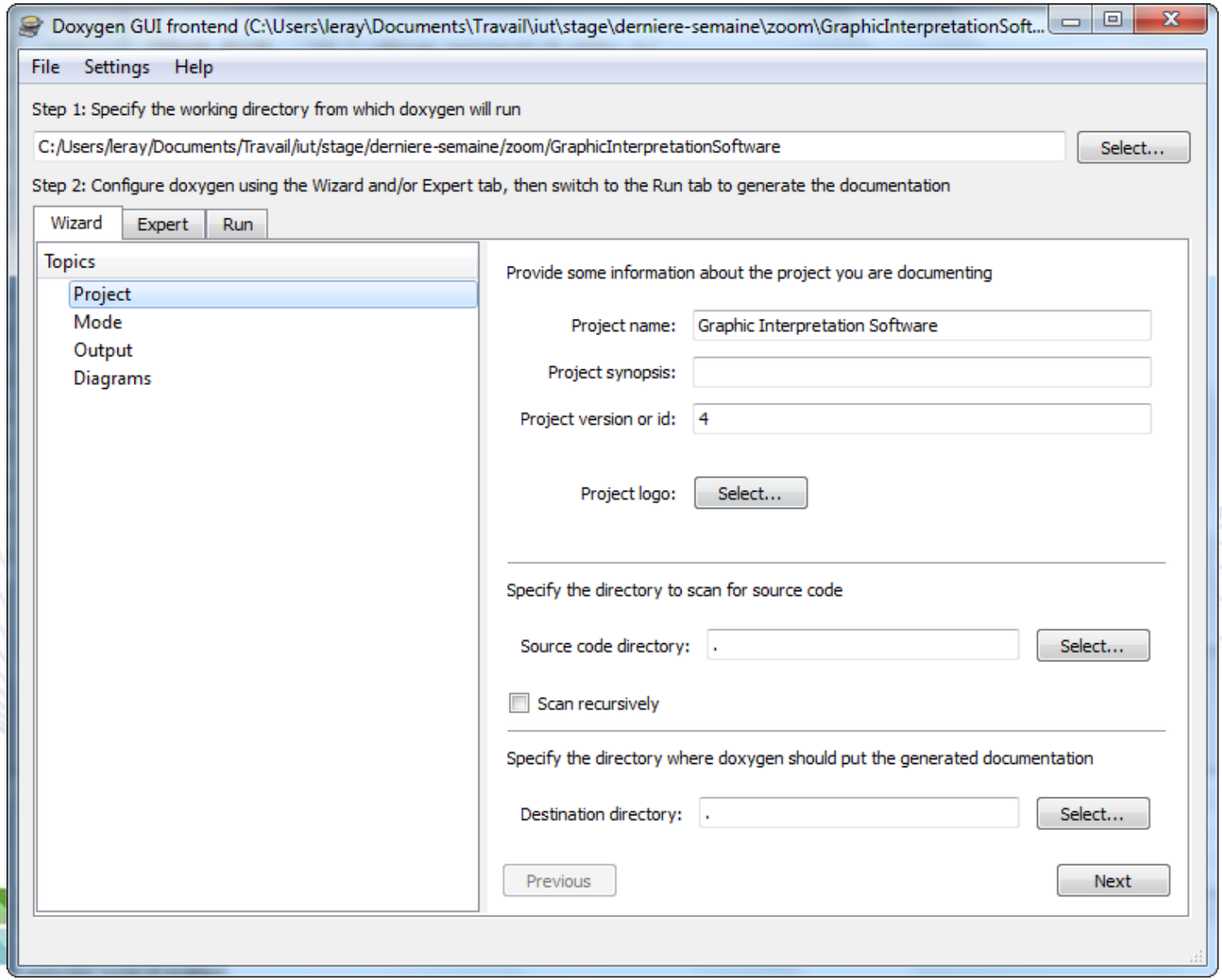
```
Configuration file `Doxyfile' created.

Now edit the configuration file and enter

  doxygen Doxyfile

to generate the documentation for your project
```

- DoxyWizard
  - on any operating system
  - easy way to generate Doxygen's documentation

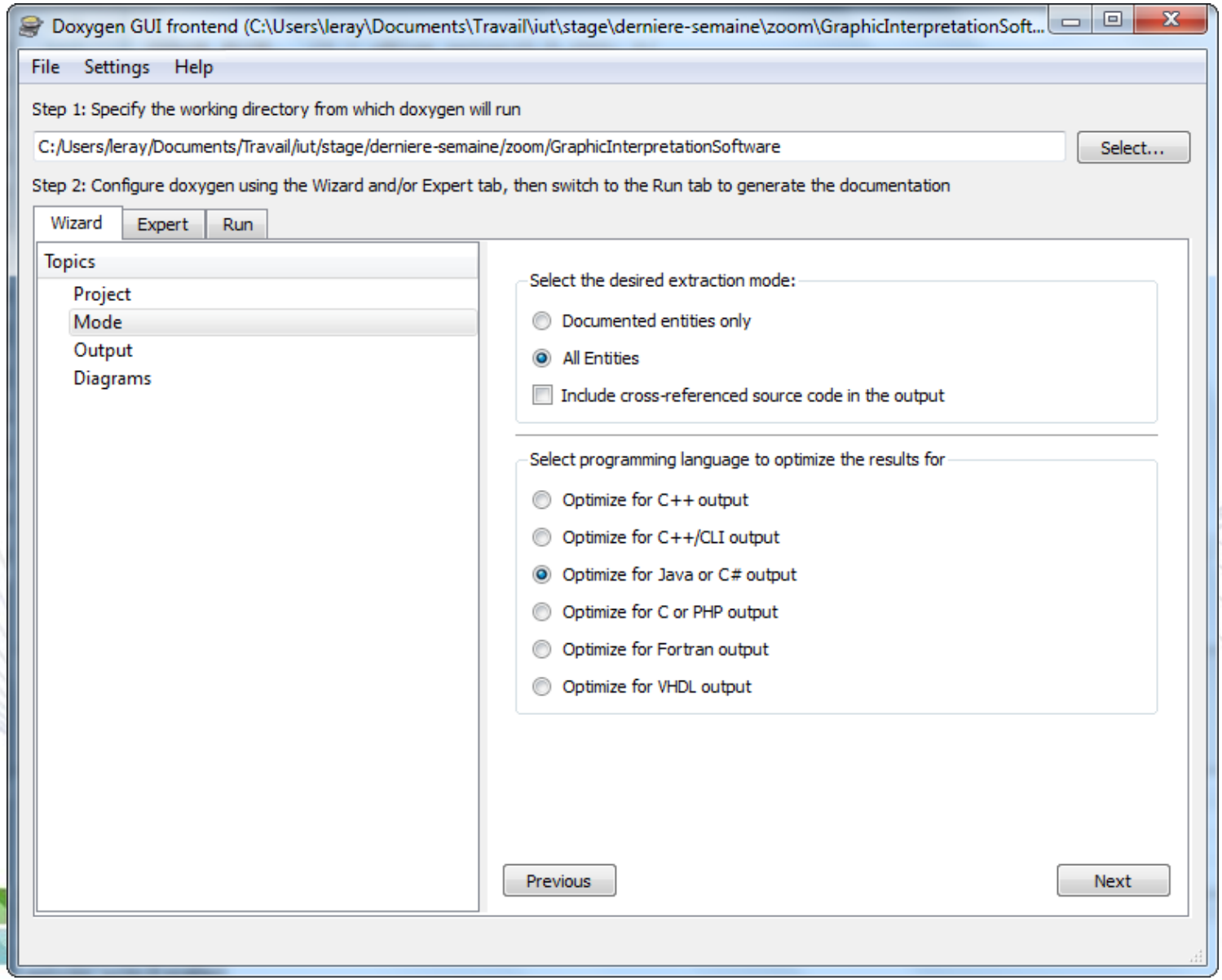
DoxyWizard

- Prerequisite
  - installation of Doxygen
  - installation of the tool Graphviz
  - the code is fully documented
- Launch
  - doxywizard.exe in Windows
  - command 'doxywizard' in Linux

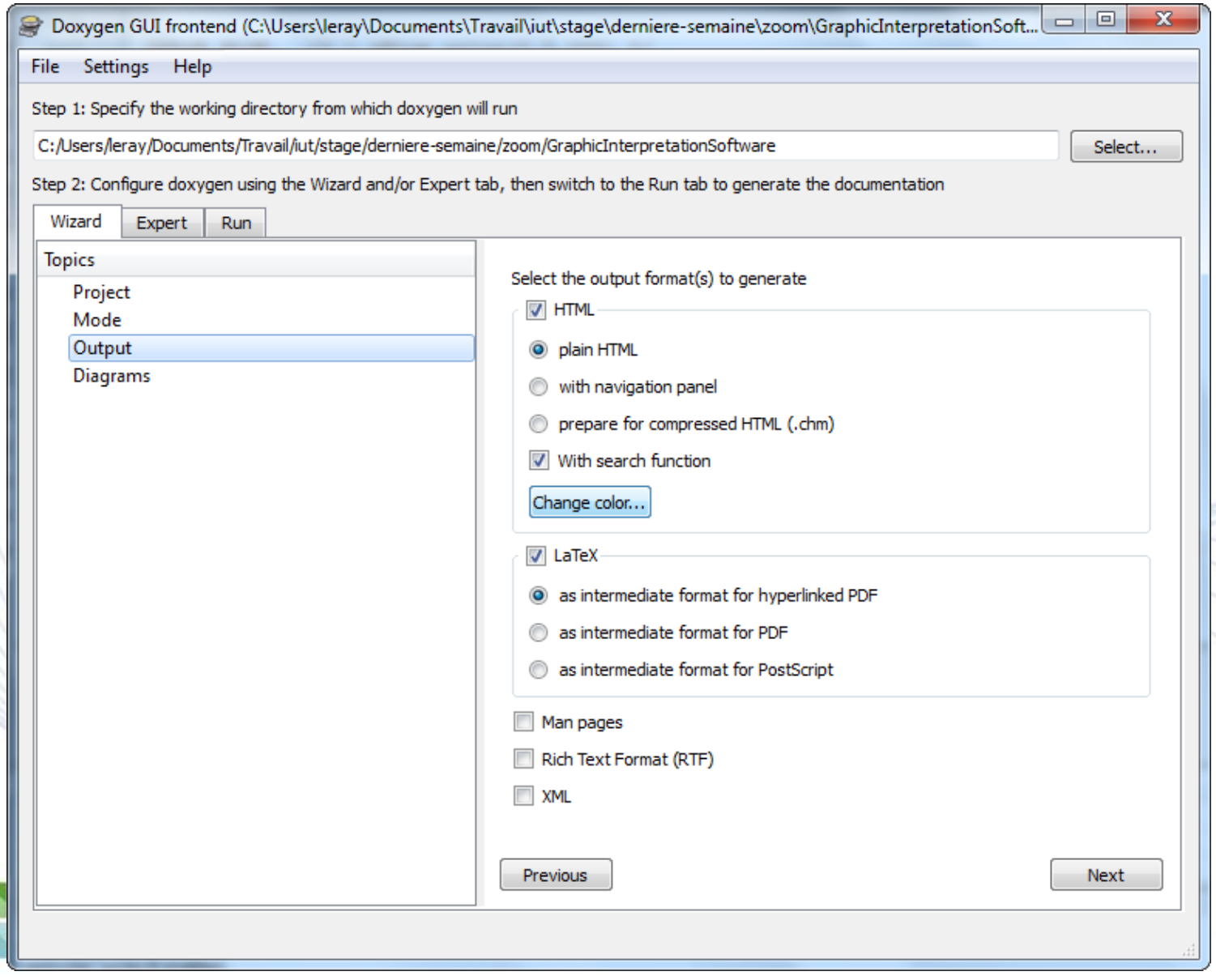
Wizard I


Doxygen GUI frontend (C:\Users\leray\Documents\Travail\iut\stage\derniere-semaine\zoom\GraphicInterpretationSoft...
File
Settings
Help
Step 1: Specify the working directory from which doxygen will run
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware
Select...
Step 2: Configure doxygen using the Wizard and/or Expert tab, then switch to the Run tab to generate the documentation
Wizard
Expert
Run
Topics
Project
Mode
Output
Diagrams
Provide some information about the project you are documenting
Project name:
Graphic Interpretation Software
Project synopsis:
Project version or id:
4
Project logo:
Select...
Specify the directory to scan for source code
Source code directory:
.
Select...
Scan recursively
Specify the directory where doxygen should put the generated documentation
Destination directory:
.
Select...
Previous
Next

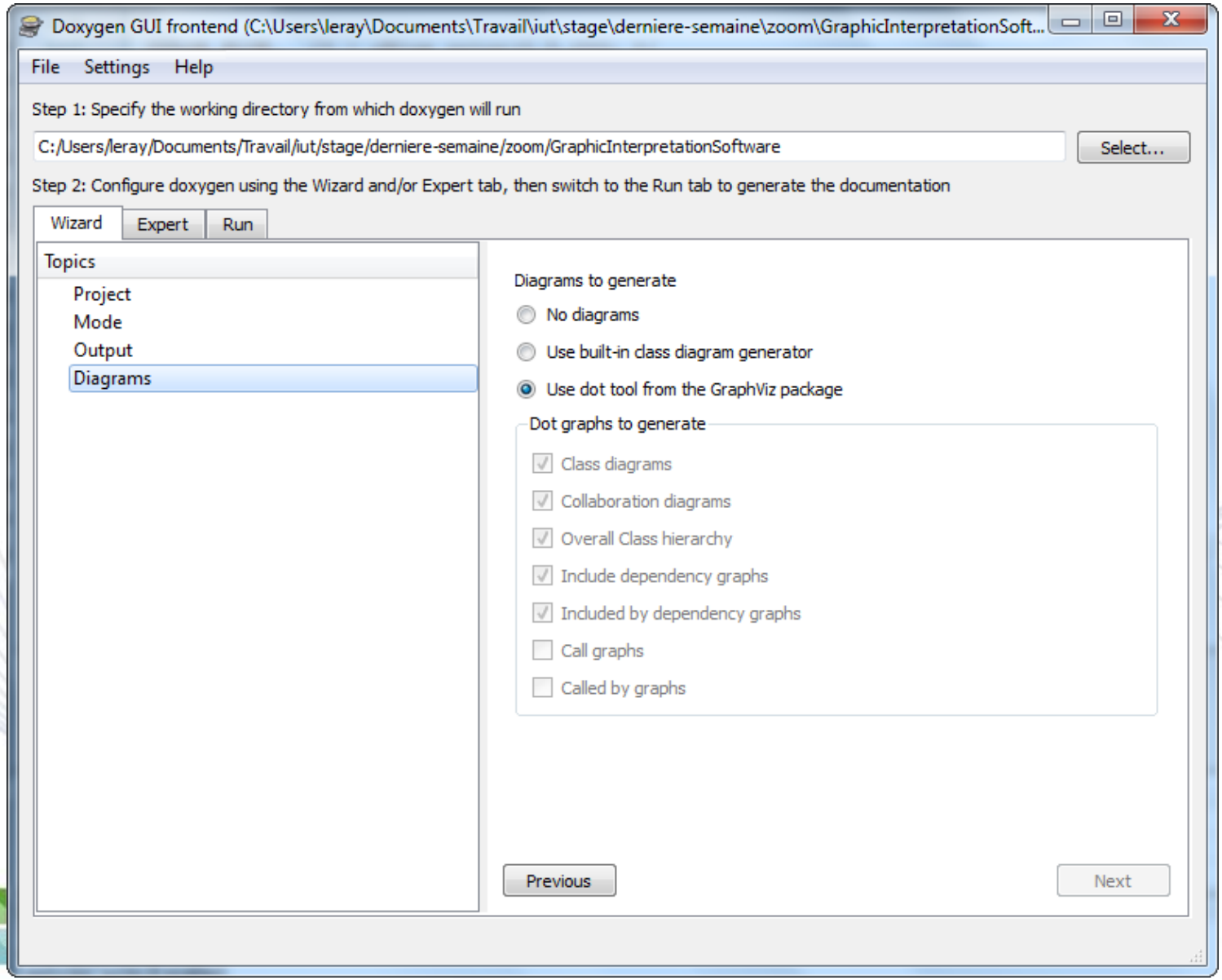
Wizard II


Doxygen GUI frontend (C:\Users\leray\Documents\Travail\iut\stage\derniere-semaine\zoom\GraphicInterpretationSoft...
File
Settings
Help
Step 1: Specify the working directory from which doxygen will run
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware
Select...
Step 2: Configure doxygen using the Wizard and/or Expert tab, then switch to the Run tab to generate the documentation
Wizard
Expert
Run
Topics
Project
Mode
Output
Diagrams
Select the desired extraction mode:
Documented entities only
All Entities
Include cross-referenced source code in the output
Select programming language to optimize the results for
Optimize for C++ output
Optimize for C++/CLI output
Optimize for Java or C# output
Optimize for C or PHP output
Optimize for Fortran output
Optimize for VHDL output
Previous
Next

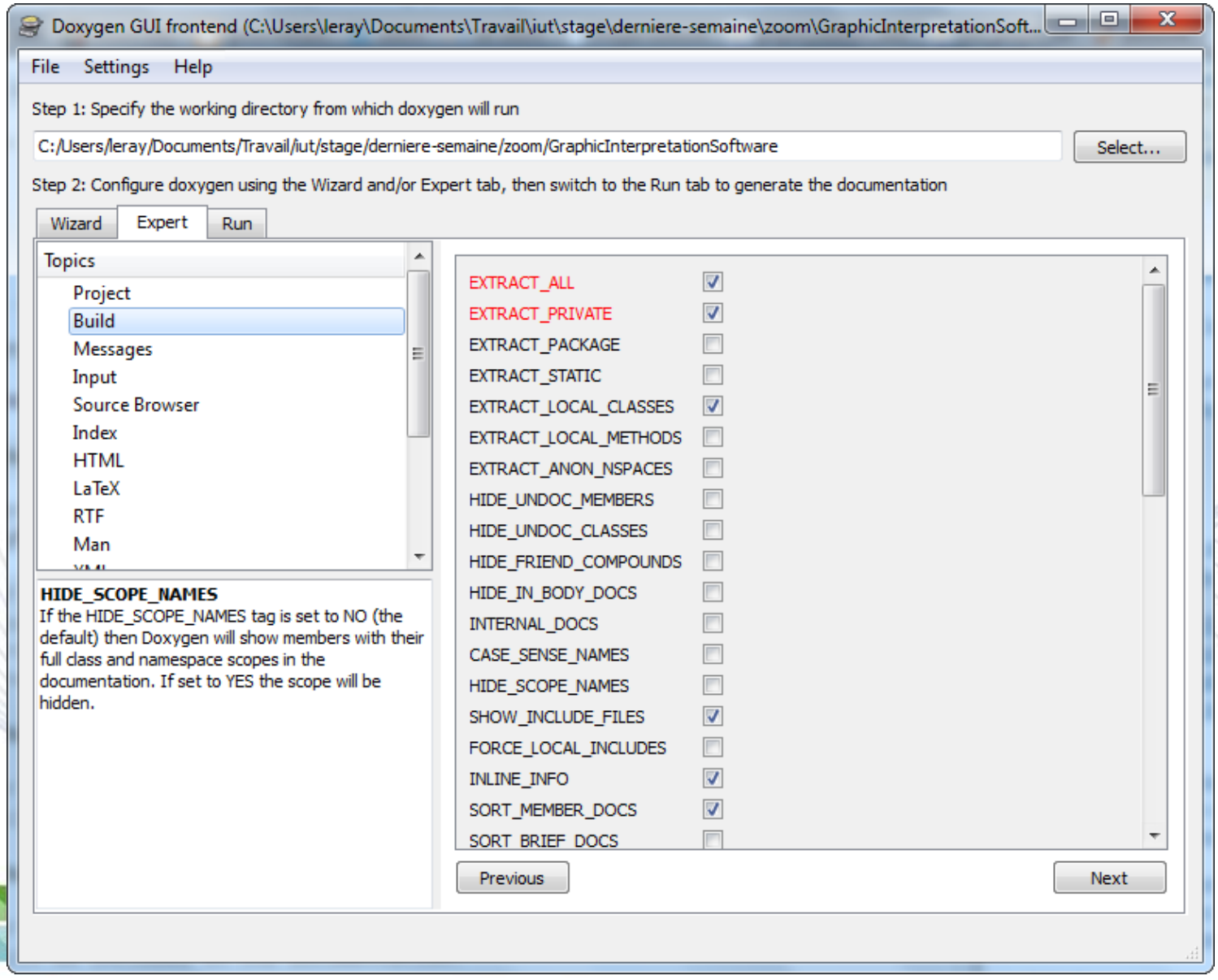
Wizard III


Doxygen GUI frontend (C:\Users\leray\Documents\Travail\iut\stage\derniere-semaine\zoom\GraphicInterpretationSoft...
File
Settings
Help
Step 1: Specify the working directory from which doxygen will run
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware
Select...
Step 2: Configure doxygen using the Wizard and/or Expert tab, then switch to the Run tab to generate the documentation
Wizard
Expert
Run
Topics
Project
Mode
Output
Diagrams
Select the output format(s) to generate
HTML
plain HTML
with navigation panel
prepare for compressed HTML (.chm)
With search function
Change color...
LaTeX
as intermediate format for hyperlinked PDF
as intermediate format for PDF
as intermediate format for PostScript
Man pages
Rich Text Format (RTF)
XML
Previous
Next

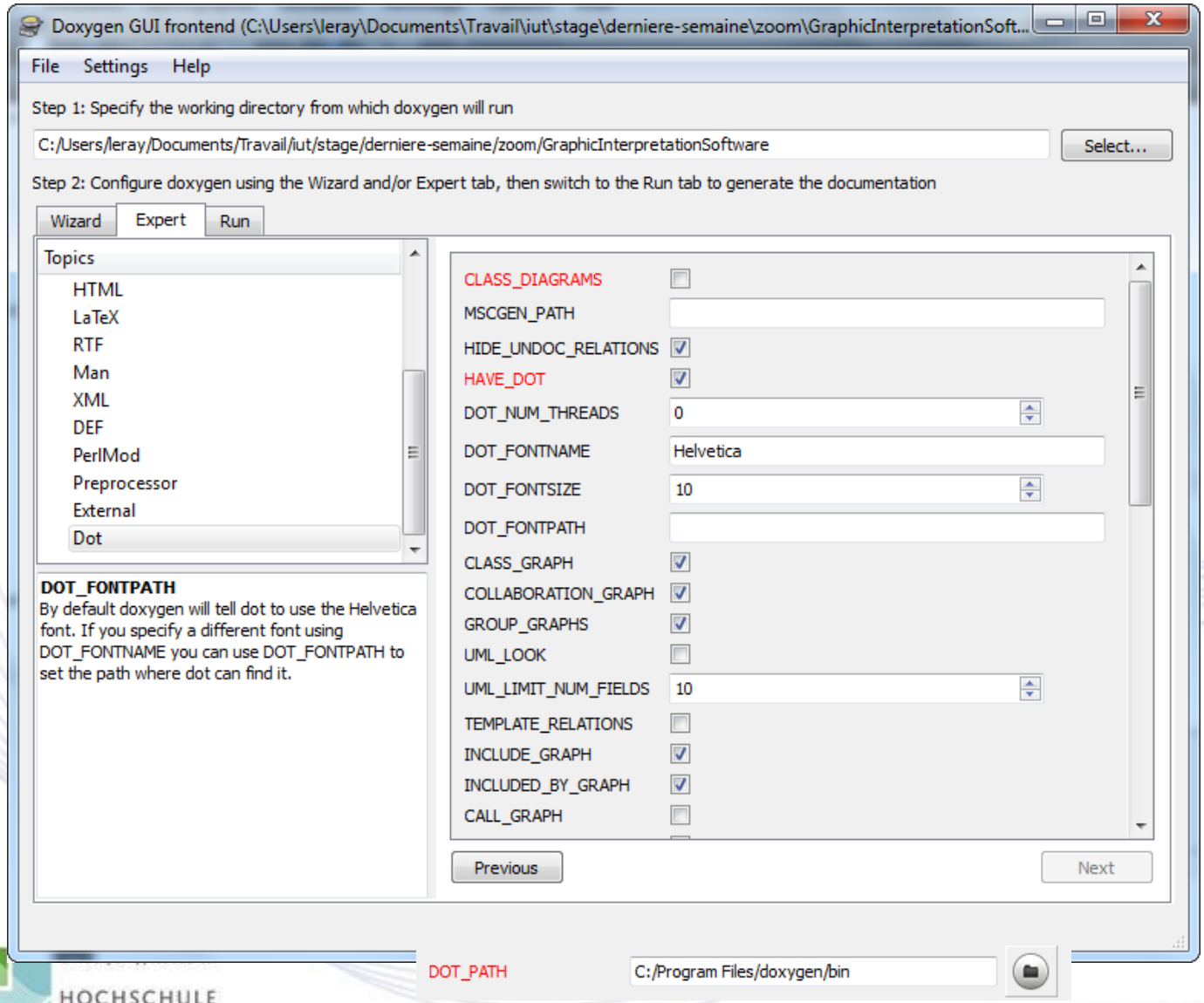
Wizard IV


Doxygen GUI frontend (C:\Users\leray\Documents\Travail\iut\stage\derniere-semaine\zoom\GraphicInterpretationSoft...
File
Settings
Help
Step 1: Specify the working directory from which doxygen will run
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware
Select...
Step 2: Configure doxygen using the Wizard and/or Expert tab, then switch to the Run tab to generate the documentation
Wizard
Expert
Run
Topics
Project
Mode
Output
Diagrams
Diagrams to generate
No diagrams
Use built-in class diagram generator
Use dot tool from the GraphViz package
Dot graphs to generate
Class diagrams
Collaboration diagrams
Overall Class hierarchy
Include dependency graphs
Included by dependency graphs
Call graphs
Called by graphs
Previous
Next

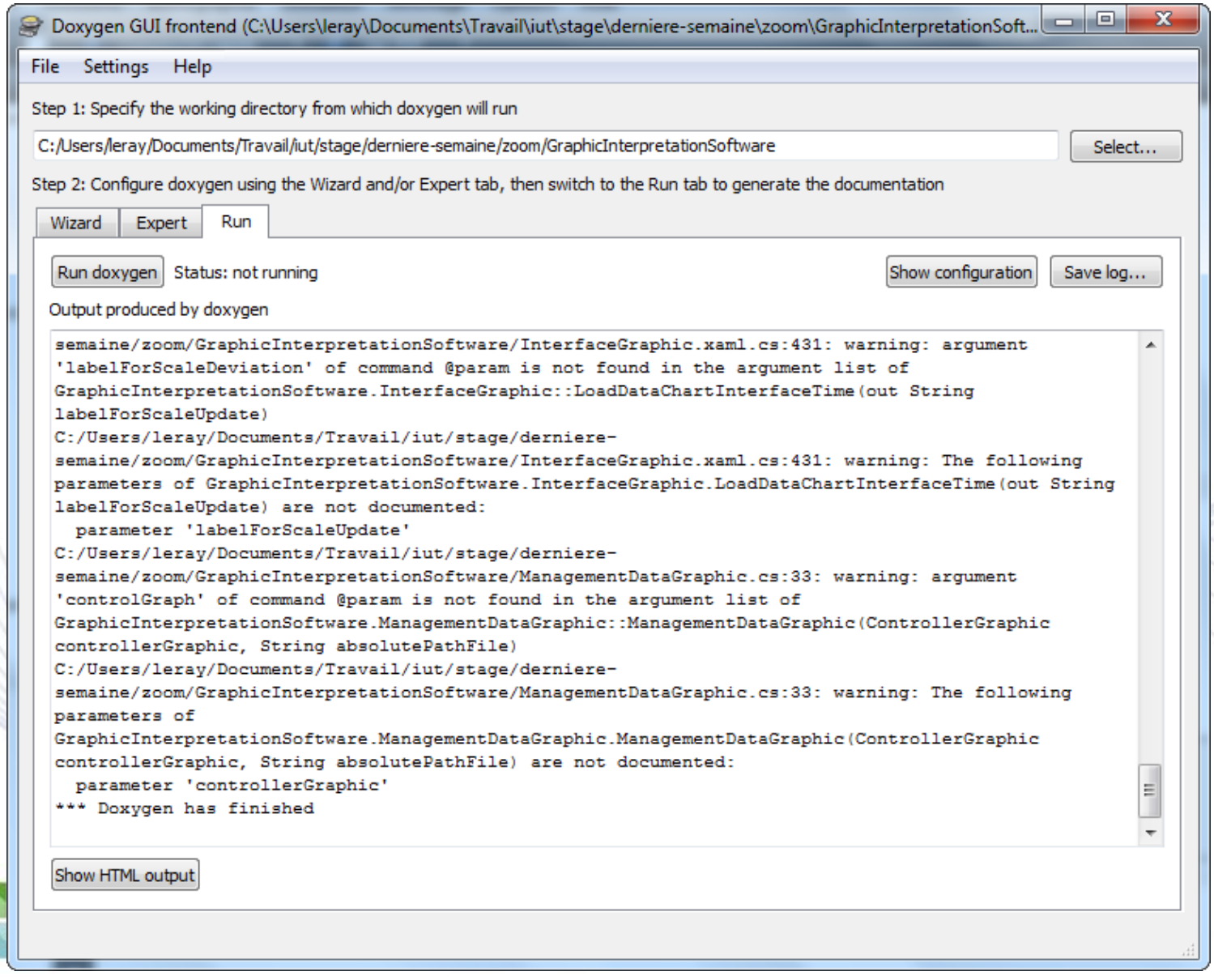
Expert I


Doxygen GUI frontend (C:\Users\leray\Documents\Travail\iut\stage\derniere-semaine\zoom\GraphicInterpretationSoft...
File
Settings
Help
Step 1: Specify the working directory from which doxygen will run
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware
Select...
Step 2: Configure doxygen using the Wizard and/or Expert tab, then switch to the Run tab to generate the documentation
Wizard
Expert
Run
Topics
Project
Build
Messages
Input
Source Browser
Index
HTML
LaTeX
RTF
Man
HIDE_SCOPE_NAMES
If the HIDE_SCOPE_NAMES tag is set to NO (the default) then Doxygen will show members with their full class and namespace scopes in the documentation. If set to YES the scope will be hidden.
EXTRACT_ALL
EXTRACT_PRIVATE
EXTRACT_PACKAGE
EXTRACT_STATIC
EXTRACT_LOCAL_CLASSES
EXTRACT_LOCAL_METHODS
EXTRACT_ANON_NSPACES
HIDE_UNDOC_MEMBERS
HIDE_UNDOC_CLASSES
HIDE_FRIEND_COMPOUNDS
HIDE_IN_BODY_DOCS
INTERNAL_DOCS
CASE_SENSE_NAMES
HIDE_SCOPE_NAMES
SHOW_INCLUDE_FILES
FORCE_LOCAL_INCLUDES
INLINE_INFO
SORT_MEMBER_DOCS
SORT_BRIEF_DOCS
Previous
Next

Expert II


Doxygen GUI frontend (C:\Users\leray\Documents\Travail\iut\stage\derniere-semaine\zoom\GraphicInterpretationSoft...
File
Settings
Help
Step 1: Specify the working directory from which doxygen will run
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware
Select...
Step 2: Configure doxygen using the Wizard and/or Expert tab, then switch to the Run tab to generate the documentation
Wizard
Expert
Run
Topics
HTML
LaTeX
RTF
Man
XML
DEF
PerlMod
Preprocessor
External
Dot
DOT_FONTPATH
By default doxygen will tell dot to use the Helvetica font. If you specify a different font using DOT_FONTNAME you can use DOT_FONTPATH to set the path where dot can find it.
CLASS_DIAGRAMS
MSCGEN_PATH
HIDE_UNDOC_RELATIONS
HAVE_DOT
DOT_NUM_THREADS
0
DOT_FONTNAME
Helvetica
DOT_FONTSIZE
10
DOT_FONTPATH
CLASS_GRAPH
COLLABORATION_GRAPH
GROUP_GRAPHS
UML_LOOK
UML_LIMIT_NUM_FIELDS
10
TEMPLATE_RELATIONS
INCLUDE_GRAPH
INCLUDED_BY_GRAPH
CALL_GRAPH
Previous
Next
DOT_PATH
C:/Program Files/doxygen/bin

Run


Doxygen GUI frontend (C:\Users\leray\Documents\Travail\iut\stage\derniere-semaine\zoom\GraphicInterpretationSoft...
File
Settings
Help
Step 1: Specify the working directory from which doxygen will run
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware
Select...
Step 2: Configure doxygen using the Wizard and/or Expert tab, then switch to the Run tab to generate the documentation
Wizard
Expert
Run
Run doxygen
Status: not running
Show configuration
Save log...
Output produced by doxygen
semaine/zoom/GraphicInterpretationSoftware/InterfaceGraphic.xaml.cs:431: warning: argument 'labelForScaleDeviation' of command @param is not found in the argument list of GraphicInterpretationSoftware.InterfaceGraphic::LoadDataChartInterfaceTime(out String labelForScaleUpdate)
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware/InterfaceGraphic.xaml.cs:431: warning: The following parameters of GraphicInterpretationSoftware.InterfaceGraphic.LoadDataChartInterfaceTime(out String labelForScaleUpdate) are not documented:
parameter 'labelForScaleUpdate'
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware/ManagementDataGraphic.cs:33: warning: argument 'controlGraph' of command @param is not found in the argument list of GraphicInterpretationSoftware.ManagementDataGraphic::ManagementDataGraphic(ControllerGraphic controllerGraphic, String absolutePathFile)
C:/Users/leray/Documents/Travail/iut/stage/derniere-semaine/zoom/GraphicInterpretationSoftware/ManagementDataGraphic.cs:33: warning: The following parameters of GraphicInterpretationSoftware.ManagementDataGraphic.ManagementDataGraphic(ControllerGraphic controllerGraphic, String absolutePathFile) are not documented:
parameter 'controllerGraphic'
*** Doxygen has finished
Show HTML output

Presentation

Presentation

Demonstration

Example

Example

https://www.woolseyworkshop.com/2020/06/25/documenting-python-programs-with-doxygen/